

Stone finds from excavation seasons 1998, 1999, 2000 and 2001. Techno-typological analysis

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New excavations were started in the Earthen Fort of Százhalombatta in 1998 within the frames of international collaboration. With the help of excavation and analytical methods applied in the course of the recent excavations, in Hungary so far unknown quantity and typological variety of Bronze Age stone tools, objects and jewellery could be identified. The present study contains the description of the stone finds unearthed during these four seasons first of all from the aspect of typology and production technology.

Stone finds from excavation season 1998

78 stone finds were examined during the excavation season of 1998.

Description of polished stone tools, 1998:

Raw material: quartzite pebble. Fragment of a hammerstone.
Size: 54 x 65 x 44 mm
Rm: fine-grained sandstone. Grindstone. S: 116 x 70 x 34 mm
Rm: fine-grained sandstone. Grindstone. S: 60 x 84 x 25 mm
ID: 18. Rm: White, seemingly soft stone with cortex on the back, under analysis. Trapezoid, start of a perforation on the front, unfinished, amulet, half finished?, hole 1–2 mm, S: 45 x 12 x 7 mm
ID: 29. Rm: quartzite pebble. Narrow smoothing pebble, spoon-shaped. S: 75 x 24 x 8 mm
ID: 32. Rm: under analysis. Point fragment of a polished stone tool. S: 37 x 26 x 10 mm
ID: 33. Rm: under analysis. Fragment of a stone axe, broken at the hole. The working edge is pointed, it must have been sharp. The back side is damaged. The front bears ripples of boring. S: 48 x 44 x 30 mm
ID: 34. Rm: under analysis. End fragment of a shaft-hole stone axe. It is broken at the hole from the backside, the butt

edge is narrow. Oval body with medium high sides. S: 50 x 49 x 45 mm
ID: 98? Rm: sandstone, fine-grained. Fragment of a polishing stone. Small, one working surface worn to a smooth trough-shape. A worn black spot. S: 84 x 50 x 30 mm

16 of the above were grouped among tools worked with polishing. They can be grouped in the following way:

Name	Raw material	Item number
Amulet, half-perforated	white, soft stone	1
Bead, perforated	baked clay	2
Grindstone	sandstone	3, 2 fragments
Hammerstone	Quartzite, natural pebble	2 fragments
Smoothing stone	Quartzite pebble	2
Axe	Being analysed	3 fragments

Table 1. Distribution of the polished stone tools according to function.

I have counted 54 chipped stone tools.

Description of the chipped stone tools, 1998.

ID: 11. Rm: Buda chert, patina in spots, Atypical flake, S: 21 x 17 x 5 mm
ID: 12. Rm: hydroquartzite with cortex on the frontal face. Pre-saw on a thin, crescent-shaped flake. S: 19 x 34 x 7 mm
ID: 13. Rm: Buda chert, lilac-blackish, sporadically patinated. Pre-saw with retouching. A trapezoid thin flake, bifacial 3 large, rough saw retouches, too roughly finished. S: 26 x 23 x 6 mm
ID: 15. Rm: Buda chert. Saw on a trapezoid flake, too short and too thick, a spoiled pre-saw shape, which seems to show tiny

retouches on one side of the edge from both sides, it can be a very worn saw as well, the remains of a core. S: 26 x 14 x 9 mm
ID: 16. Rm: hydroquartzite. Typical flake, cutting tool, pre-saw. It is on a blade-like flake, there is no base, the bulb is small, it is a trapezoid, a thin pre-saw shape, a shiny wear can be seen on the left edge of the frontal face from the dorsal face, the right upper edge is indented, it was used as a knife for cutting. S: 31 x 12 x 6 mm

ID: 17. Rm: Buda chert? Middle fragment of a blade? S: 15 x 13 x 5 mm

ID: 19. Rm: Buda chert, brownish-lilac variety. Saw on a flake. A bulky, crescent-shaped flake with bifacial saw retouching, sickle shine on both sides.

ID: 2. Rm: Buda chert. Atypical flake. S: 17 x 19 x 9 mm
ID: 20/a. Rm: Buda chert, sporadically patinated. Atypical flake, trapezoid, bulky. S: 20 x 21 x 9 mm

ID: 20/b. Rm: Buda chert. Atypical borer on a flake. S: 25 x 15 x 7 mm

ID: 21. Rm: Buda chert, sporadically patinated. Saw on a crescent-shaped flake, the lower part is broken, the saw edge is totally worn, the edge was made by tiny bifacial retouches, parallel sickle shine on both sides of the saw-edge. S: 24 x 23 x 9 mm

ID: 22. Rm: Buda chert, sporadically patinated. Saw on a crescent-shaped flake, worn it was retouched from the dorsal face, unifacial saw-retouches S: 29 x 33 x 5 mm

ID: 24. Rm: Buda chert. Atypical blade-like flake. S: 24 x 21 x 10 mm

ID: 25/a. Rm: Buda chert, with cortex. Pre-saw on a flake, spoilt. A blade-like flake, the single row of retouching reached an inclusion and got spoilt. S: 31 x 18 x 11 mm

ID: 25/b. Rm: sillex? Hydroquartzite? Pre-saw on a flake with retouches. A crescent-shaped flake with three retouches, made on one side, it was intended to be a saw but the edge became uneven, spoilt. S: 22 x 19 x 9 mm

ID: 26/a. Rm: Buda chert. Saw on a trapezoid flake, bifacial saw retouching, parallel sickle shine on both sides, worn saw edge. S: 24 x 25 x 7 mm

ID: 26/b. Rm: Buda chert. Saw on a blade-like flake with a ridge on the frontal face, the saw edge is made with 3 unifacial retouches, elaborated from the dorsal face, S: 27 x 17 x 9 mm

ID: 26/c. Rm: Buda chert, sporadically patinated. Saw on a trapezoid flake, tiny saw retouches, worn or spoilt? S: 21 x 19 x 6 mm

ID: 27. Rm: Buda chert, sporadically patinated. Saw on a blade-like flake, with 2 bifacial retouches, S: 30 x 18 x 5 mm
ID: 28/a. Rm: Buda chert. Atypical borer on a flake. S: 32 x 12 x 9 mm

ID: 28/b. Rm: Buda chert, sporadically cortical. Pre-saw on a flake with retouches. A crescent-shaped flake, initial retouching from the dorsal side. S: 25 x 27 x 11 mm
ID: 28/c. Rm: translucent quartzite, sporadically patinated and cortical. Atypical flake. S: 25 x 18 x 7 mm

ID: 3. Rm: Buda chert, patinated. Uncharacteristic flake. S: 20 x 14 x 8 mm

ID: 36. Rm: Buda chert, sporadically cortical. Saw on a crescent-shaped flake, very small, with 1 retouch on one side, worn to this point. S: 19 x 16 x 5 mm

ID: 37. Rm: Buda chert. Atypical flake. S: 19 x 17 x 10 mm

ID: 38. Rm: Buda chert. Atypical blade-like flake. S: 23 x 13 x 7 mm

ID: 39. Rm: limnoquartzite from the Hron valley, blackish-grey with white filaments. Saw on a crescent-shaped flake, the side opposite to the saw edge is broken, the working edge is bifacial, sickle shine can be observed on only one side, the other side is cortical. S: 26 x 26 x 11 mm.

ID: 40. Rm: quartzite. Atypical flake, crescent-shaped. S: 18 x 16 x 3 mm.

ID: 42. Rm: Buda chert, sporadically patinated. Atypical blade-like flake. S: 23 x 20 x 7 mm

ID: 43. Rm: grey sillex with cortex. Atypical blade-like flake, middle fragment. S: 18 x 15 x 8 mm

ID: 44. Rm: Buda chert, sporadically patinated. Atypical blade-like flake. S: 32 x 15 x 7 mm

ID: 45. Rm: Buda chert, sporadically patinated. Saw on a trapezoid flake, bifacial saw retouching, sickle shine on both sides. S: 18 x 16 x 4 mm

ID: 46/a. Rm: Buda chert, patinated. Atypical, blade-like, bulky flake. S: 34 x 22 x 9 mm

ID: 46/b. Rm: Buda chert, patinated. Pre-saw on a crescent-shaped flake. S: 26 x 21 x 6 mm

ID: 46/c. Rm: Buda chert, patinated. Pre-saw on a crescent-shaped flake. S: 20 x 19 x 5 mm

ID: 46/d. Rm: Buda chert. Atypical borer on a flake. S: 18 x 10 x 9 mm

ID: 47. Rm: Buda chert, sporadically patinated. Atypical blade-like flake. S: 23 x 13 x 7 mm

ID: 48. Rm: Buda chert, sporadically patinated. Saw on a broken flake, injured from the base. 2 saw retouches, bifacial with sickle shine. S: 24 x 20 x 11 mm

ID: 49. Rm: Buda chert, sporadically patinated. Atypical blade-like flake. S: 26 x 12 x 4 mm

ID: 5/a. Rm: Buda chert. Pre-saw on a crescent-shaped flake. S: 33 x 26 x 6 mm

ID: 5/b. Rm: Buda chert, patinated. Pre-saw on a crescent-shaped flake. S: 34 x 32 x 11 mm

ID: 50. Rm: Buda chert, sporadically patinated. Pre-saw on a crescent-shaped flake. S: 24 x 21 x 10 mm

ID: 51. Rm: Buda chert. Atypical flake. S: 25 x 15 x 11 mm

ID: 52. Rm: Buda chert, patinated. Atypical flake. S: 20 x 14 x 10 mm

ID: 53. Rm: Buda chert, sporadically patinated. Saw on a flake. The middle fragment of a blade-like flake, 2 bifacial retouches, parallel sickle shine. S: 19 x 10 x 8 mm

ID: 54/a. Rm: Buda chert, cortex on one face. Saw on a trapezoid flake, 1 unifacial saw retouch, S: 19 x 19 x 5 mm

ID: 54/b. Rm: Buda chert, sporadically patinated. Saw on a trapezoid blade-like flake, 1 bifacial saw retouch. S: 28 x 15 x 6 mm

ID: 55. Rm: Buda chert with manganese precipitation on the frontal face. Saw on a crescent-shaped flake with a bifacial saw edge, parallel sickle shine. S: 21 x 21 x 7 mm

ID: 6. Rm: Buda chert. A pre-saw on a flake, crescent-shaped, bulky. S: 38 x 19 x 14 mm

ID: 7/a. Rm: Buda chert. Atypical flake. S: 21 x 16 x 7 mm

ID: 7/b. Rm: brown sillex, patinated. The middle fragment of a blade with two ridges on the frontal face. S: 18 x 14 x 4 mm

ID: 9. Rm: limno/hydroquartzite. Saw on a very worn, bulky, crescent-shaped flake. The saw retouch is unifacial, the other side is only irregularly narrowed along the edge, the sickle shine is stronger on one side, parallel with the edge, the saw edge is worn. S: 26 x 19 x 9 mm

The preliminary raw material distribution of the above is the following:

Raw material	Item number
Buda chert / hornstone	44
Hydroquartzite	2
Limnoquartzite	2, different
Quartzite	2
Silex	2, different
Undetermined	1

Table 2: Raw material distribution of the flaked stone tools from 1998.

We can tell the followings about the raw materials used for chipping:

Cortex and patina are clearly visible on the surfaces of the tools, sometimes covering the entire surface, sometimes only part of the surfaces. This strong patination and cortex development is partly due to the geological source area of the tools, partly to being embedded for millennia.

The majority of the tools were made of Buda chert (as the classical local-regional raw material of the middle Bronze Age Vátya culture). Several varieties of the Buda chert could be differentiated beside the well-known greyish, translucent variety of conchoidal fracture. A lilac-blackish and a brownish-lilac variety were also found in the material from 1998, and a variety covered by black manganese precipitation occurred in the old excavation material. This phenomenon can imply that the chert varieties came from different geological provenances although it is also possible that they are so varied within a single geological source. The structure of the unusual greyish-translucent variety is somewhat more homogenous, less rigid, contains inclusions and it is more suitable for tool flaking.

Limnoquartzite is equally varied (yellowish, translucent and blackish-greyish, compact with white filaments) similarly to the silex raw material (greyish and brown).

Type list of the tools:

I could find altogether 21 atypical chips and flakes that were/could not be used. 21 items of waste from 54 stone artefacts is a large number,

which can indicate local workshop and/or the poor quality of the raw material – in this case the Buda chert. There were three atypical borers in the find material (*Pl. 1/1.*).

Name	Raw material	Item number
Waste	Buda chert	18, 3 atypical borers
Waste	Quartzite	2
Waste	Silex	1

Table 3: Raw material distribution of the flakes.

The remaining chipped artefacts can be divided into the following groups:

A/Half ready tools, or tools that were not completed

B/retouched tools

C/multiply transformed tools

D/spoilt items

E/totally worn tools unfit for use.

Regarding their use, the tools were saws except for the middle fragments of two blades, which did not show any trace of tool making and use.

Name	Raw material	Item number
Blade, middle fragments	Silex	1
	Buda chert	1
Pre-saw forms, on flakes	Buda chert	10
	Hydroquartzite	2
	Undetermined	1
Saws on flakes	Buda chert	15
	Limnoquartzite	2

Table 4: Typological grouping of the finds.

Saw was again the leading type in the settlement, as it can be read from the Table. These tools were made, in most of the cases, from Buda chert with splinter technique. The flakes were probably removed by a hard hammer (quartzite pebble). When the round chert-bulbous was broken, most often it went to slice-shape's flakes. Due to the quality of the raw material we could not find any item that would show the platform and the bulb that develops at traditional chipping. A small bulb was observed in the tool material in a single case on a small blade-like flake made from hydroquartzite but there was no platform (pre-saw no. 16, the sharp sides of the tool were used as cutting edges without transformation). The lack of

platforms and bulbs can imply several things: first it can indicate the poor quality of the raw material, which did not afford the preparation of a regular, prepared core from which regular flakes/blades (i.e. ones with prepared platforms and bulbs) could be chipped. Another reason can be the decrease of size, damage of the tools caused by the use, which necessitated their subsequent transformation. The subsequent transformation of a flake (e.g. the removal of the protruding parts, the thinning of the lateral edges, the retouching of the new working edge) must have been occasional in the majority of the cases. We could not find any item with wear-shine or nearly wear-shine that would indicate the real size of the tools in the material unearthed this year. Saw no. 39 made of limnoquartzite has the largest measurements: the side opposite the working edge of the saw where the tool was hafted is broken, yet its measurements are 26 x 26 x 11 mm (*Pl. 1/3*). The measurements of a totally worn saw are 19 x 16 x 5 mm. The difference caused by use is between 5 and 10 mm.

There were no cores found in the material from 1998, only a totally worn saw made on the remains of a core. It was tried to transform it into a new tool but its shape became too short and too bulky even after transformation.

The saws were made and continuously transformed on crescent-shaped and trapezoid flakes. Several items can be observed in the material that reflect various stages of preparation, they are called pre-saws. There are items among them where only the shape of the tool suggests that they were intended to be further transformed into saws (which did not happen for some reason). On other items the retouching of the saw edge was started. Unsuccessful preparation could be observed on two items (*e.g. Pl. 1/2*).

The production technology of the items determined as saws at the present stage of the excavations has brought about interesting new results, which could not be observed in the old excavation materials. The saws were used at the harvest of the cereals, which is proved by the use wear shine clearly visible on the working edges of the tools. Erzsébet Bácskai definitely determined these traces as use wear caused by cereal stalks.¹ We could not

find any evidence as yet in what form the tools got into contact with the cereals during harvest or later e.g. at chaffing, nor if they were used as independent cutting tools or they were inserted in wooden, bone or antler hafts. In the material from 1998 we found two items with unifacial and 8 items with bifacial sickle shine. This implies that the tools were not uniformly used or hafted.

The saw was made with several retouching techniques. Unifacial retouching can be observed on the saw edge in 7 cases, bifacial in 10 cases. A row of small retouches can be seen on two tools. Unifacial retouch was combined with thinning from the other side on saw no. 9 (*Pl. 1/4*), while on pre-saw no. 28/b, an initial retouch can be seen made from the dorsal face which was not completed.

We can draw the conclusion from the continuous transformation of the tools that they were very intensively used, and they got strongly worn, damaged and broken. People tried to mend them with subsequent transformations.

The greatest result of the year was the demonstration of the unfinished pre-saws in the find material.

Stone tools from the excavation season 1999

148 stone artefacts were examined from the 1999 excavation season.

38 of the artefacts can be grouped among the polished stone tools.

Description of the polished stone tools, 1999:

ID: 12. Rm: quartzite. Perforated pebble: thin, flat amulet pierced from both sides. S: 16 x 12 x 2, hole 2 mm
ID: 545. Rm: quartzite. Round smoothing pebble. S: 67 x 51 x 40 mm

ID: 368. Rm: quartzite. Round smoothing pebble. S: 69 x 39 x 13 mm

ID: 427. Rm: quartzite. Flat smoothing pebble, the end is broken.

ID: 71. Rm: Quartzite. 3 polishing pebbles.

ID: 780. Smoothing pebble.

ID: pit no. 166. Rm: fine-grained Hárshegy-type sandstone. The end fragment of a grindstone. The grinding surface is smooth, shiny, worn, hemispherical, finely elaborated. S: 90 x 164 x 85 mm

ID: 15. Smoothing pebble

ID: 101. Rm: quartzite. The end fragment of a large, flat hammer pebble.

ID: 335. Rm: pebbly, coarse-grained rock. The side fragment of a grindstone. The entire surface is encrusted, hemispherical, the grinding surface is deep trough-shaped, worn and shiny. S: 85 x 60 x 50 mm

¹ Here I would like to thank her for her work.

ID: 516. Rm: quartzite. A huge hammer and smoothing pebble, one end is broken. S: 125 x 95 x 56 mm
ID: 247. Rm: fine-grained crumbling sandstone. Polishing stone. S: 95 x 73 x 25 mm
ID 10–13. Rm: Quartzite. Smoothing pebble.

ID: 41. 2 smoothing pebbles.

ID: 460. Rm: fine-grained rock, unanalysed as yet. The side fragment of a grindstone, the whole surface is encrusted, the grinding surface is shiny, smooth, finely elaborated. S: 64 x 34 x 37 mm

ID: 103. Rm: fine-grained limestone? Grindstone, 2 items, fitting? Both are lateral fragments, one with the grinding surface, trough-shaped, smooth, the stone is finely dressed. S: 116 x 98 x 45 mm

ID: 45. Rm: patinated quartzite pebble. A pierced flat disc, amulet, the hole was symmetrically pierced from both sides. S: 25 x 22 x 6, hole d: 7 mm

ID: 47. Rm: patinated, being analysed. A prismatic whetstone, fragment, one end is missing. S: 54 x 20 x 15 mm
ID: 10. Rm: patinated, being analysed. A net weight or a hammerstone. It is grooved in the middle, both terminals are worn, pockmarked. S: 62 x 54 x 62 mm

ID: 199. Rm: quartzite pebble. Pestle, elongated pebble both sides pockmarked, one more strongly than the other. S: 98 x 52 x 40 mm

ID: 529. Rm: patinated, being analysed. Hammerstone, flatter and more angular. Worn especially on the narrower sides, the flat disc faces are not worn. S: 54 x 57 x 44 mm
ID: 39. Rm: igneous rock, patinated, being analysed. An angular broken rubbing stone. S: 48 x 50 x 46 mm

ID: 394. Rm: quartzite, patinated. Large, angular rubbing stone, one side is flat and smooth, the edges are worn, broken. S: 68 x 64 x 44 mm

ID: 398. Rm: elongated quartzite, patinated, cortical. Flat hammerstone broken into two. S: 43 x 46 x 26 mm

ID: 14. Rm: quartzite. Hammerstone fragment. S: 57 x 48 x 40 mm

ID: 341. Rm: quartzite. Hammerstone fragment. S: 39 x 54 x 34 mm

ID: 98. Rm: being analysed, patinated. The fragment of a stone tool polished to a prismatic shape. It was used as a hammerstone. S: 44 x 51 x 41 mm

ID: 98. Rm: being analysed. The same as the above one just more angular. S: 43 x 64 x 31 mm

ID: 137. Rm: patinated, being analysed. The edge-side half of a trapezoid wedge-shaped axe, large, the edge is arched, the dorsal face is flat, the frontal face is slightly convex.

Traces of use wear from several directions along the edge, the working edge is indented, the upper side is fragmentary. S: 58 x 62 x 14 mm

ID: 70/2. Rm: clay? A round net weight or mace imitation, side fragment with the shaft hole, broken at the hole. S: 60 x 34 x 44 mm

ID: 420. Rm: patinated, pink with black stripes, resembles granite, being analysed. Corner fragment of a grindstone, worn smooth. S: 98 x 120 x 67 mm

ID: 282. Rm: sandstone. The fragment of an axe or the top of a weight, broken at the shaft hole and at the side, the flat sides are smooth, the convex ones are not so smooth. S: 66 x 43 x 56 mm

ID: 86. Rm: quartzite pebble. Amulet, a thin, flat pebble pierced from both sides. S: 16 x 12 x 2, hole d: 2 mm

Functional distribution of the polished stone tools:

Name	Raw material	Item number
Amulet, pierced	Quartzite pebble	2
Whetstone	Being analysed	1
Grindingstone	Sandstone, conglomerate, Fine-grained limestone?	5
Polishing stone	Crumbling sandstone	1
Pebble hammerstone	Quartzite, natural shape	4
Smoothing pebble	Quartzite, natural shape	13
Rubbing stone	Quartzite, igneous rock	3
Pestle		1
Polished axes: Undetermined fragments	Being analysed	3
Wedge-edged, trapezoid		1
Weights?: Inverted in the middle, hammer?		1
Mace? / weight, Shaft-hole axe? / weight	Clay, baked?	1
	Sandstone	1

Table 5: *Grouping of the polished stone tools according to function.*

Two small, flat discoid, polished, pierced amulets can be grouped among the jewellery. They were made from pebbles. The holes were pierced from both sides. Regarding the hardness of the quartzite, it could be accomplished because the quartzite pebbles to be pierced were extremely thin (2 and 6 mm).

Five grindstones were used for cereal grinding. All the five are fragments, 3 were fine-grained, 2 were coarse-grained. The material of two larger fragments was obviously fine-grained (limestone?), which is an unusual phenomenon in the settlement. The hemispherical shape of the original piece could be determined at two fragments. Shiny grinding surfaces were found in 3 cases, trough-shaped surfaces in 2 cases. The rubbing stones were represented by 3 rubbing stones and 2 pestles. Two of the three rubbing stones were broken, item no. 529 also served as a

hammer, while no. 39 was made of igneous rock instead of quartzite.

The grindstones and the rubbing stones show strong wear and damages, which implies long and hard work.

The most characteristic representative of the polished axes is the trapezoid, wedge-edged axe fragment no. 299. The tool must have originally been large (it got damaged early in its lifetime, beyond repair).

The following ones are problematic from determination point of view:

- The fragment of a tool polished from sandstone. It can be the top of a weight or the lateral fragment of a shaft-hole axe, which was damaged at the hole. The raw material suggests a weight (282).
- The lateral fragment of a discoid object damaged at the shaft-hole. It was made perhaps of baked clay or some sedimentary rock. It can be a net weight or a mace, although it is not heavy enough for the latter (70/2).
- An angular tool made of stone, which is inverted in the middle probably serving for fixing or hafting. Both terminals show the traces of hammering. It could be a net weight or a hammer stone (10).

111 finds were grouped among the chipped stone tools.

Description of the chipped stone tools, 1999:

Rm: Buda chert, cortical and patinated on the surface. Saw on a typical flake. A crescent-shaped flake, the saw edge was made by small bifacial retouches, worn, flat core base, the bulb is large, broken from the surface, the platform is pointed. S: 26 x 21 x 9 mm

Rm: Buda chert, sporadically patinated. Saw on a crescent-shaped flake, bifacial saw edge. S: 23 x 20 x 8 mm
Rm: Buda chert. Pre-saw on a blade with retouch. The platform of the blade is flat, the bulb is medium large, the saw edge was made by a unifacial row of retouches on the distal end. S: 24 x 21 x 5 mm

Rm: Buda chert, cortical frontal face. Saw on a crescent-shaped flake, worn saw edge, bifacial, slight sickle shine. S: 24 x 20 x 8 mm

ID: Rm: Buda chert, cortical. Atypical flake. S: 24 x 21 x 10 mm

ID: Rm: Buda chert. Atypical, blade-like flake. S: 28 x 14 x 7 mm

ID: 103. Rm: Buda chert, sporadically patinated. Pre-saw on a trapezoid, blade-like flake. S: 23 x 19 x 7 mm

ID: 104. Rm: Buda chert, sporadically patinated. Atypical flake. S: 30 x 20 x 8 mm

ID: 105. Rm: Buda chert, cortical. Atypical flake, core remain, cortical core base, trapezoid, bulky flake. S: 28 x 23 x 10 mm
ID: 107. Rm: Buda chert, cortical. Atypical flake. S: 24 x 21 x 10 mm

ID: 11. Rm: silex, translucent. Typical flake, sporadically patinated frontal face, the platform is flat, there is no bulb. S: 24 x 21 x 6 mm

ID: 11. Rm: limnoquartzite from the Hron valley, cortical, mainly on the frontal face. Saw on a typical, trapezoid flake, the bulb is medium large – large, the platform is diedre, this can be the initial size of the saw, the upper side is retouched on one side (hafting?). The saw edge is made with sometimes bifacial retouches, it is broken in the middle at the bottom from the frontal face, with slight, parallel sickle shine. S: 45 x 39 x 13 mm

ID: 110. Rm: Buda chert, cortical. Saw on a flake. A totally worn, broken saw. 3 retouches, bifacial, an example of the totally worn items. S: 20 x 12 x 7 mm

ID: 111. Rm: Jaspilite, brownish-greenish. Atypical, blade-like flake. S: 27 x 13 x 8 mm

ID: 111/a. Rm: Buda chert, cortical. Atypical flake. It is thin, blade-like, pointed. S: 23 x 9 x 5 mm

ID: 111/b. Rm: Buda chert. Flake, pre-saw, spoilt. A blade-like flake, the frontal face is cortical, the saw edge could not be made since there is a sharp bend in the sharp edge. S: 31 x 20 x 9 mm

ID: 111/c. Rm: white variety of the Buda chert, cortical. Saw on a crescent-shaped flake, broken on the bottom, the saw edge was made by tiny retouches, bifacial, on the saw-edge with parallel sickle shine. S: 8 x 12 x 6 mm

ID: 12. Rm: Buda chert. Atypical flake. S: 17 x 20 x 4 mm
ID: 127. Rm: yellowish silex? Atypical flake. S: 21 x 18 x 7 mm

ID: 128. Rm: Buda chert, cortical at the bottom. Pre-saw on a crescent-shaped flake. S: 22 x 15 x 7 mm

ID: 14. Rm: Buda chert, a spot of cortex on the frontal face. Pre-saw on a flake with retouches. A trapezoid flake, the initial retouches of a saw on the frontal face. S: 20 x 19 x 6 mm

ID: 160. Rm: white limnoquartzite? The middle fragment of a blade with a ridge on the frontal face. S: 21 x 19 x 7 mm
ID: 160. Rm: jaspilite, pebble, yellowish-greenish, cortical. Flake, worn off saw? A blade-like fragment, a segment of a pebble, the edge seems to be the totally worn off edge of a saw, unifacial retouching, perhaps also retouched on a lateral side? S: 21 x 19 x 9 mm

ID: 162. Rm: Buda chert, patinated in spots. Saw on a bulky, crescent-shaped flake, bifacial, uneven saw retouch, worn off, very strong, parallel sickle shine, initial size with primarily worn off saw edge. S: 42 x 26 x 15 mm

ID: 164. Rm: Buda chert, cortical. Saw on a trapezoid flake, with bifacial saw edge, sickle shine. S: 24 x 17 x 8 mm

ID: 166/a. Rm: brownish yellow, translucent limnoquartzite, cortical frontal face. Atypical flake. S: 20 x 19 x 5 mm

ID: 166/b. Rm: Buda chert. Pre-saw on a trapezoid flake. S: 17 x 20 x 8 mm

ID: 166/c. Rm: Buda chert. Atypical, crescent-shaped flake. S: 27 x 20 x 10 mm

ID: 184. Rm: Buda chert, cortex on half of the frontal face. Saw on a trapezoid flake, the saw edge made with bifacial, uneven retouches, parallel slight sickle shine on the edge, bifacial retouch on the upper short side – turned, reused. S: 23 x 17 x 6 mm

ID: 2. Rm: Buda chert, patinated. Saw on a crescent-shaped flake, approximately the initial size, with bifacial saw edge, sickle shine mainly on the dorsal face, burin-like terminal, the edge is fairly worn. S: 46 x 28 x 11 mm
 ID: 209. Rm: Buda chert, sporadically patinated. Atypical, blade-like flake. S: 23 x 27 x 6 mm
 ID: 213. Rm: Buda chert, sporadically patinated. Pre-saw on a crescent-shaped flake. S: 29 x 18 x 12 mm
 ID: 227/a. Rm: Buda chert, sporadically patinated. Saw on a short, thick flake with bifacial saw retouch, burin-like terminal. S: 19 x 15 x 9 mm
 ID: 227/b. Rm: Buda chert, lilac-white variety, cortical. Pre-saw on a crescent-shaped flake, the edge is still thick. S: 17 x 9 x 4 mm
 ID: 24/a. Rm: Buda chert, white variety, sporadically cortical. Saw on a crescent-shaped flake, unifacial saw edge with a single row of thin, blunting retouch on the dorsal face. S: 18 x 17 x 7 mm
 ID: 24/b. Rm: Buda chert, sporadically patinated. Saw on a crescent-shaped flake, bulky, single row of blunting saw retouch on the frontal face, borer-like terminal. S: 31 x 19 x 13 mm
 ID: 247. Rm: Buda chert, patinated and cortical frontal face. Atypical flake. S: 20 x 14 x 4 mm
 ID: 247/a. Rm: Buda chert, patinated. Atypical flake. S: 24 x 12 x 10 mm
 ID: 247/b. Rm: Buda chert, patinated. Atypical flake. S: 11 x 13 x 7 mm
 ID: 257. Rm: Buda chert, sporadically cortical. Saw on a flake. A totally worn saw on a crescent-shaped flake, broken at the top, sickle shine, the retouch has totally worn off. S: 20 x 19 x 7 mm
 ID: 326. Rm: Buda chert. Atypical flake. S: 25 x 18 x 9 mm
 ID: 33. Rm: Buda chert, patinated. Atypical, blade-like flake. S: 16 x 8 x 2 mm
 ID: 338. Rm: Buda chert, cortical. Atypical, trapezoid flake. S: 24 x 19 x 7 mm
 ID: 338. Rm: Buda chert, cortical. Atypical, flake. S: 24 x 20 x 17 mm
 ID: 34/a. Rm: Buda chert, cortical. Atypical, rough flake. S: 36 x 27 x 15 mm
 ID: 34/b. Rm: Buda chert, sporadically patinated. Atypical blade-like flake, broken. S: 19 x 12 x 7 mm
 ID: 34/c. Rm: Buda chert, lilac-white variety, sporadically patinated. Saw on a crescent-shaped flake, broken at the bottom, bifacial saw edge, slight sickle shine. S: 16 x 23 x 6 mm
 ID: 34/d. Rm: Limnoquartzite, yellowish-white, patinated. Middle fragment of a blade. S: 42 x 20 x 10 mm
 ID: 341. Rm: Buda chert, patinated in spots. Typical flake with the flaking surface of the core, blade-like, the platform of the core, the bulb is small, the platform is diedre. S: 23 x 23 x 7 mm
 ID: 342. Rm: Buda chert, cortical frontal face. Atypical flake. S: 17 x 11 x 10 mm
 ID: 347. Rm: Buda chert, or the fragment of a quartzite pebble? Atypical flake. S: 19 x 19 x 10 mm
 ID: 35. Rm: Hydroquartzite? Atypical, trapezoid flake. S: 17 x 17 x 8 mm
 ID: 35. Rm: Buda chert, sporadically cortical. Saw on a crescent-shaped flake, bifacial, large, deep saw retouch, sickle shine. S: 32 x 34 x 10 mm
 ID: 37. Rm: undetermined. Chip. S: 17 x 5 x 6 mm

ID: 371. Rm: Buda chert, patinated. Typical flake. The bulb is medium large, the platform is flat. S: 23 x 28 x 9 mm
 ID: 382. Rm: Buda chert, sporadically patinated. Saw on a crescent-shaped, elongated flake, bifacial, worn off saw retouch, sickle shine, row of tiny retouches. S: 27 x 15 x 7 mm
 ID: 383. Rm: lidit, greyish, sporadically patinated. Retouched knife on a blade, on the distal end is end-scraper. A blade with two ridges on the frontal face, retouched on both lateral edges, totally worn off, the retouch was made on one face, one side is indented in the middle closer to the thicker, perhaps distal end, there could be end-scraper edge on both terminals but they got worn off as well. S: 55 x 26 x 10 mm
 ID: 39. Rm: Buda chert, sporadically patinated. Saw on a trapezoid flake, with bifacial, deep saw retouch. S: 25 x 24 x 17 mm
 ID: 391. Rm: Buda chert, cortical. Saw on a thin, crescent-shaped flake, the saw edge is worn off, the retouch is bifacial, parallel sickle shine can be seen on one side. S: 23 x 17 x 4 mm
 ID: 392. Rm: Buda chert, dark grey variety, cortical, contains a cavity. Atypical borer on a flake. S: 33 x 35 x 8 mm
 ID: 393. Rm: Buda chert, cortical. Atypical flake. S: 25 x 14 x 12 mm
 ID: 394/a. Rm: Buda chert. Atypical flake. S: 12 x 7 x 4 mm
 ID: 394/b. Rm: reddish silex, sporadically cortical. Blade? Proximal fragment, probably of a blade, the platform is flat, the bulb is medium large. S: 12 x 16 x 4 mm
 ID: 401. Rm: Buda chert, sporadically cortical. Saw on a crescent-shaped flake, the saw edge made with bifacial retouches, on the edge is parallel sickle shine. S: 18 x 15 x 5 mm
 ID: 403/a. Rm: Szentgál radiolarite, sporadically cortical. Saw on a typical flake. Triangular, the platform is flat, the bulb is small, a single row of retouches on the dorsal face, totally worn off. S: 30 x 34 x 10 mm
 ID: 403/b. Rm: Buda chert, patinated. Atypical flake. S: 23 x 23 x 10 mm
 ID: 403/c. Rm: Buda chert, cortical. Atypical flake, broken. S: 23 x 23 x 10 mm
 ID: 421. Rm: Buda chert, cortical dorsal face. Atypical flake. S: 20 x 15 x 7 mm
 ID: 43. Rm: Buda chert, sporadically patinated frontal face. Atypical flake, crescent-shaped, broken. S: 31 x 29 x 13 mm
 ID: 45/a. Rm: Buda chert, patinated. Pre-saw on a thin, crescent-shaped flake. S: 20 x 27 x 5 mm
 ID: 45/b. Rm: Buda chert, cortical. Atypical flake, broken. S: 24 x 15 x 12 mm
 ID: 46. Rm: Buda chert, sporadically cortical. Atypical flake, blade-like, thin. S: 25 x 20 x 5 mm
 ID: 46. Rm: claret-brownish jaspilite, radiolarite?, sporadically patinated. Saw on a crescent-shaped flake, the saw retouch is bifacial, in each two rows, bifacial retouches are on the opposite side-edge for hafting?, the saw edge is worn with tiny retouches. S: 28 x 17 x 5 mm
 ID: 462. Rm: Buda chert, cortical frontal face. Saw on a typical flake. A crescent-shaped flake, the bulb is large, the platform is diedre, the saw retouch is uniform in a single row, sickle shine. S: 27 x 27 x 9 mm
 ID: 465. Rm: limnoquartzite? White, cortical. Atypical flake. S: 27 x 22 x 9 mm
 ID: 49. Rm: Buda chert, patinated. Saw on a crescent-shaped flake, bifacial saw retouches in two rows. S: 34 x 27 x 8 mm

ID: 5. Rm: Buda chert, cortical. Atypical flake. S: 29 x 20 x 8 mm

ID: 5/a. Rm: Buda chert, sporadically patinated. Atypical flake, trapezoid. S: 20 x 18 x 7 mm

ID: 5/b. Rm: Buda chert, sporadically patinated. Saw on a long, narrow, crescent-shaped flake, the saw retouches are bifacial, uneven, on the edge parallel slight sickle shine. S: 32 x 17 x 5 mm

ID: 507. Rm: Buda chert, patinated and cortical. Atypical flake, trapezoid. S: 28 x 25 x 10 mm

ID: 51. Rm: quartzite. Atypical flake. S: 19 x 17 x 5 mm

ID: 511. Rm: white Buda chert. Saw on a flake fragment, the saw-edge made with 3 scalariform bifacial retouches, crescent-shaped, on the edge is slight, parallel sickle shine, the present base was the initial saw edge, worn off, unifacial, totally worn off. S: 18 x 14 x 6 mm

ID: 511. Rm: silicified wood. Unworked flake.

ID: 515. Rm: quartzite (hydro?). Atypical flake with concentric circles on the dorsal face. S: 27 x 20 x 4 mm

ID: 542. Rm: Buda chert, patinated. Atypical flake, blade-like. S: 35 x 24 x 10 mm

ID: 547. Rm: Buda chert, cortical on the frontal face. Pre-saw on a blade-like flake, the left edge is broken. S: 27 x 20 x 9 mm

ID: 65. Rm: Buda chert, cortical in spots. Atypical flake, rough, crescent-shaped. S: 29 x 19 x 8 mm

ID: 66. Rm: quartzite like 166/a. Atypical flake. S: 14 x 9 x 4 mm

ID: 66. Rm: Buda chert, sporadically patinated. Atypical thin flake. S: 23 x 15 x 3 mm

ID: 68. Rm: Buda chert, sporadically cortical. Atypical flake, blade-like. S: 32 x 19 x 13 mm

ID: 7/a. Rm: Buda chert. Atypical flake. S: 16 x 10 x 3 mm

ID: 7/b. Rm: Buda chert, patinated. Saw on a crescent-shaped flake, broken at the bottom, bifacial saw retouches. S: 16 x 20 x 6 mm

ID: 72. Rm: Buda chert, cortical. Atypical flake, core remain. S: 29 x 20 x 15 mm

ID: 73. Rm: whitish-greyish limnoquartzite. Atypical flake, blade-like. S: 36 x 21 x 11 mm

ID: 76. Rm: Buda chert, sporadically cortical. Pre-saw on a thin, blade-like flake. S: 18 x 10 x 6 mm

ID: 78. Rm: Buda chert, sporadically cortical. Pre-saw on a large flake. S: 49 x 26 x 11 mm

ID: 8. Rm: hydroquartzite, milky, translucent, cortical on the dorsal face. The proximal fragment of a blade. The bulb is small, the platform is broken. S: 25 x 18 x 6 mm

ID: 80. Rm: yellow hydroquartzite. The distal fragment of a blade. There are two ridges on the frontal face, a totally worn off end-scraper edge could be in the distal terminal. S: 23 x 14 x 4 mm

ID: 81. Rm: Buda chert, cortical in spots. Pre-saw of a flake, crescent-shaped. S: 21 x 24 x 7 mm

ID: 81. Rm: Buda chert, sporadically patinated. Atypical flake, trapezoid, blade-like. S: 31 x 21 x 8 mm

ID: 850. Rm: limnoquartzite from the Hron valley, blackish, greasy lustre. Blade core, core remain. The platforms is cortical, it ends in a point. There are 2 blade negatives on the frontal face, 4 blade negatives on the dorsal face and a crosswise negative on the lateral side. S: 44 x 40 x 31 mm

ID: 9/a. Rm: Buda chert, patinated. Saw on a crescent-shaped flake, bifacial saw retouches, totally worn off, strong sickle shine. S: 24 x 15 x 9 mm

ID: 9/b. Rm: Buda chert, patinated. Pre-saw on a blade-like flake. S: 29 x 20 x 7 mm

ID: 90. Rm: Buda chert, cortical in spots on the frontal face. Atypical flake, crescent-shaped. S: 21 x 17 x 7 mm

ID: 94. Rm: Buda chert, sporadically cortical. Saw on a long, blade-like, trapezoid flake, with a worn off saw edge, bifacial, slight sickle shine, which cannot be see because of the cortex. S: 21 x 14 x 5 mm

ID: 95/a. Rm: Buda chert. Typical flake, medium large bulb. S: 16 x 13 x 3 mm

ID: 95/b. Rm: Buda chert, sporadically patinated. Saw on a large, trapezoid flake, with bifacial saw edge, it made with uneven retouches in a single row, on the edge is parallel sickle shine. S: 38 x 29 x 11 mm

ID: 97. Rm: Buda chert, cortical on the edge. Atypical flake. S: 15 x 14 x 7 mm

ID: 97. Rm: Buda chert, sporadically cortical. Atypical borer on a flake. S: 37 x 25 x 10 mm

The technological distribution of the above is the following:

Name	Item number
Tools	31
Waste	49
Half-made items	15
Atypical tools	3

Table 6: Technological distribution of the flaked stone tools

The distribution of the flake stone tools according to raw material was the following:

Raw material	Item number
Varieties of Buda chert	86
Jaspilite varieties	4
Silices	3
Jaspilites	4
Limnoquartzite types	8
Hydroquartzite types	5
Silicified wood	1
Together	111

Table 7: Distribution of the flaked stone tools according to raw materials

The raw materials used for flaking show the widest spectre observed so far in the find material from 1999. New varieties could be observed of the Buda chert beside the earlier met greyish,

translucent variety and the ones known from the 1998 material: a white, a dark coloured and a lilac white variety. Following the dominant Buda chert, limnoquartzite types were used the most frequently for tool making. Limnoquartzites can also be divided into varieties: white, whitish-greyish, yellowish white and yellow ones. They probably belong to a related facies. Besides, the raw material of three (typologically most eminent) tools was a blackish greyish limnoquartzite with embedded white linaments, which was also met in the old excavations material ("limnoquartzite from the Hron valley") and a saw was made of the same raw material in the 1998 material. A retouched knife on a blade (ID. No. 383.) was probably also made from imported raw material. The raw material of this multiply transformed tool maybe from the Banatian territory. The raw material (lilit from alluvial deposit?) is similar to the one part of the Dunaföldvár-chipped stone treasure (Pl. 2/5, Pl. 5/3).²

The hydroquartzites were represented in the find material by a milky translucent and a brownish yellow variety.

The provenance of the limno- and hydroquartzite types must be the deposits of watercourses.

Technologically, the material of the settlement was distributed in the following way according to shape:

As compared to earlier results, the proportion of finds with bulbs and platforms (typical flakes and blades), prepared flaking from a prepared core is relatively high in the 1999 find material. Three atypical borers were also found.

The only core was made from limnoquartzite ("from the Hron valley"). Its significance is that we found an end-scraper knife on a blade and a saw on a large flake from the same rare raw material in this find assemblage. It is a single-platform blade core with two blade negatives on the frontal face and 4 negatives on the dorsal face. The platform is cortical and the top is pointed. There is a crosswise flake negative on the thicker side (spoilt). The core was exhausted and spoilt with the crosswise flake, no more usable forms could be flaked from it (Pl. 1/5, Pl. 5/1-2).

2 T. Biró 2000. One core and 8 blades belong to the treasure.

Typological shape	Name	Item number
Typical flake	<i>Buda chert</i> : 3 saws, 3 atypical	5
	<i>Silex</i> : 1 atypical	1
	<i>Limnoquartzite</i> : 1 saw	1
	<i>Szentgál radiolarite</i> : 1 saw	1
Typical blade	<i>Buda chert</i> : pre-saw with starting retouch	1
	<i>Hydroquartzite</i> : proximal fragment	1
	<i>Limnoquartzite</i> : fragment, 1 end-scraper knife	4
	<i>Silex</i> : proximal fragment	1
Core	<i>Limnoquartzite</i> : blade core	1
Core remains	<i>Buda chert</i>	4
Atypical tools	<i>Buda chert</i> : Borer-like chips	3
Unused flakes	Atypical flakes: <i>Buda chert</i> : 37 <i>Quartzites</i> : 5 <i>Silex</i> : 1 <i>Jaspilite</i> : 1	49

Table 8: Typological distribution of the flaked stone tools.

The majority of the blades were so much injured and broken that the original shape and function could not be deduced (except for the proximal fragment of a hydroquartzite blade ID. no. 8. the two lateral edges of which were used for cutting – Pl. 2/6, and the distal fragment of a limnoquartzite blade ID. no. 80, on which a nearly entirely worn off end-scraper edge can be observed). The blade made from lilit was also broken on the base, the lateral sides and the surviving terminal and also the terminal opposite to the broken one were retouched. The blade tool could originally be an end-scraper knife, which was transformed after the damage to be suitable for further use (another end-scraper edge was made on the other terminal).

Examining the tools used in the settlement as mirrored in the year 1999, saws were once more that played an individual role.

Further technological observation on the finds:

- Burin-like or borer-like terminals were observed on four saws, which developed during use.

Tool type	Name	Item number
Saw	Buda chert Szentgál radiolarite	27 2
Pre-saw	Buda chert: shape Shape with retouching	13 2

Table 9: Tool types.

- There were pre-saw shapes met again in the find material with or without retouching.
- In 10 cases the saw edges were strongly worn (the row of retouches nearly disappeared, e.g. *Pl. 2/4*), while in two cases the tools were broken. Spoilt retouching was observed on one item, and four ones were spoilt or worn to a small size.
- Transformation necessitated by damage could be observed on tool ID. 11. made from limnoquartzite “from the Hron valley” (*Pl. 2/3*) and on the saw ID. 511. made from Buda chert. Tool ID. 511. can be an excellent example to multiple transformation: the flake from the white variety of the Buda chert was originally crescent-shaped, on which a saw was originally made with unifacial retouch. After it had worn off totally, the axis of the tool was turned by 90 degrees and the former saw edge became the bottom/base of the new tool. On the new lateral edge (which was rather thick at the flaking) the saw edge was made in three (!) steps with bifacial retouches. It took three steps to make the working edge thin enough for the saw teeth (*Pl. 3/1*).
- Regarding the sizes of the tools, the saw made on a typical flake from limnoquartzite “from the Hron valley” ID. 11 (broken in the middle from the base, *Pl. 2/3*) and the saw made on Buda chert ID. 2. (totally worn off saw edge, waiting for rejuvenation, *Pl. 2/1*) stand the closest to the initial measurements of the saws reached during the primary shaping. In the first case it was 45 x 39 x 13 mm and 46 x 28 x 11 mm in the second case. Another saw from Buda chert has similar measurements (*Pl. 2/2*). The measurements of a saw worn off to a small size already unsuitable for use were 18 x 15 x 5 mm. It means that the size

of the tool could decrease by more than the half of the original (*Pl. 3/2*).

Retouching techniques

- In 23 cases the saw edges were made bifacially, in 4 cases unifacially (*Pl. 4/1*). A row of small retouches was applied in 4 cases (on Szentgál radiolarite, which is easier to flake than chert, e.g. *Pl. 4/2*), while a row of large and deep retouches was observed in 2 cases. The row of retouches was uneven in 4 cases. Due to the thickness of the edge side of the tool, two rows had to be retouched in 2 cases and 3 rows in one case. In two cases the tools were retouched not only on the working edges, probably because of hafting.

- Sickles indicating the use of the tools was observed on two saws on one side and on 17 saws on both sides. The various ways of sickle shine development can imply hafting or a different use.

The most important finds of the 1999 excavation season was the flake tool made from limnoquartzite (from the Hron valley?) and the core from the same raw material. The combination unilaterally proves that flaking played an important role in the settlement. Significant observations were made concerning the various techniques of the shaping of saw edges and the life of the tools.

Stone finds from the excavation season of 2000

Altogether 103 stone finds were examined from the excavation season in 2000. 30 of them belonged to the polished stone tools.

Description of the polished stone tools, 2000:

ID: 639. Rm: Quartzite. Fragment of a smoothing stone. S: 65 x 47 x 35 mm

ID: 577. Rm: Quartzite. Smoothing stone. S: 53 x 47 x 35 mm

ID: 647. Rm: Quartzite. Fragment of a smoothing stone. S: 35 x 35 x 13 mm

ID: 588/b. Rm: Quartzite. Fragment of a smoothing stone. S: 27 x 18 x 7 mm

ID: 377. Rm: medium coarse-grained, pebbly, being analysed. Lateral fragment of a grindstone. S: 62 x 53 x 42 mm

ID: 271. Rm: being analysed. Terminal fragment of a grindstone, worn, small. S: 60 x 37 x 18 mm

ID: 390. Rm: patinated, being analysed. Rubbing stone, round, slightly angular, worn and pockmarked from use on three sides in the middle. S: 61 x 52 x 65 mm
 ID: 715. Rm: Quartzite. Fragment of a smoothing pebble.
 ID: 814. Rm: Quartzite, cortical. An elongated, flat smoothing pebble. S: 93 x 39 x 11 mm
 ID: 272. Rm: medium coarse-grained, being analysed. Lateral fragment of a grindstone. S: 76 x 55 x 42 mm
 ID: 322. Rm: being analysed. A spoon-shaped smoothing pebble worn smooth. S: 46 x 27 x 6 mm
 ID: 811. Rm: Quartzite, patinated. An elongated pebble, one end is arched, the dorsal face is flat, the frontal face is straight, natural shape. S: 100 x 38 x 21 mm
 ID: 588/1. Rm: whitish, very fine-grained, cortical limestone? Fragment of a grindstone. Probably it was slightly hemispherical with an elliptical, slightly trough-shaped grinding surface. S: 149 x 57 x 54 mm
 ID: 588/b. Rm: greyish with whitish stripes, very fine-grained sandstone. The fragment of a grindstone, roughly shaped, narrow grooves, traces of polishing on the grinding surface, originally it must have been hemispherical and this can be a terminal fragment. S: 106 x 105 x 55 mm
 ID: 588/3. Rm: slag piece. Pierced? Ca. L' fragment with a fragment of the hole, the surface is black, sooty? shiny, it is possible that the hole was not pierced only the slag solidified around something. S: 83 x 55 x 40 mm
 ID: 590. Rm: Quartzite. A triangular smoothing pebble. S: 61 x 58 x 28 mm

ID: 811. Rm: 3 quartzite pebbles. Fragments of smoothing pebbles.

ID: 741. Rm: medium coarse-grained Hårshøgy-type sandstone. The terminal fragment of a grindstone, hemispherical with black spots – soot? S: 76 x 17 x 53 mm
 ID: 593. Rm: limestone, spongy. The top of a weight broken at the hole, very roughly executed, the uneven surfaces are finer. S: 84 x 74 x 79 mm

ID: 160/B/a. Rm: Quartzite. The fragment of a polished stone tool, smoother or something else? Three polished sides, all broken, black – sooty? S: 66 x 54 x 29 mm
 ID: 160/B/b. Rm: being analysed. The terminal fragment of a grindstone-polisher, finely shaped, the sides and the bottom are also polished smooth, the edge of the working surface is entire, flat, the rest is strongly worn, the traces of sharpening in 2 long grooves of irregular shape. S: 130 x 60 x 84 mm
 ID: 827. Rm: Quartzite. Round smoothing pebble, one face is smoother. S: 93 x 60 x 32 mm

ID: 807. Rm: Very fine-grained, being analysed. Two fragments with polished sides. Polisher? S: 71 x 40 x 12 mm
 ID: 805/1. Rm: being analysed. Terminal fragment of a grindstone, the grinding surface is strongly trough-shaped, shiny, the stone is roughly shaped. S: 110 x 84 x 55 mm
 ID: 805/2. Rm: micaceous, crumbling sandstone. Flat, one smooth polished side, fragment of a polisher? S: 79 x 67 x 20 mm

ID: 588. Rm: medium coarse-grained Hårshøgy-type sandstone. Terminal fragment of a grindstone, the grinding surface is straight, slightly hemispherical, orange limonite precipitation on the bottom, finely shaped. S: 125 x 99 x 67 mm

Evaluation of the polished stone tools:

Grindstones and polishers: 13 fragments. Three were polishing stones, while ID. nos 160/B/b and 588/2 were combinations of grindstones and polishers. Eight items were grindstones. Six were fine- very fine-grained, 7 were medium fine-grained. Regarding the raw material Hårshøgy-type sandstones (greyish, reddish with limonite stripes, orange with limonite veins and crumbling varieties with a relatively loose structure) and a very fine, cretaceous (limestone) rock were used.

The grindstones displayed characteristic traces of wear:

- The elliptical grinding surface of ID. no. 588/1 became slightly trough-shaped.
- Narrow grooves can be seen on the grinding surface of ID. no. 588/2, which could develop during polishing.
- On the very finely finished stone ID. no. 160/b/2 the working surface became worn, deep, irregular traces can be seen in 2 long stripes, which developed during sharpening.
- The surviving grinding surface of ID. no. 805/1 became strongly trough-shaped and shiny from long use.
- A spot of black soot can be seen on grindstone ID. no. 741.

There are two finely and two roughly finished items among the grindstones, the rest were very fragmentary and the quality could not be determined. Four of the stones were certainly hemispherical.

There was a single rubbing stone (ID. No. 390), a slightly angular round item worn in the middle.

Eleven quartzite pebble smoothing stones were found, 8 of them were entire.

Besides, the top of a limestone weight, the fragment of a polished undetermined tool (smoothing pebble or axe?) were recovered and a slag piece on which a pierced hole could be observed. Its function is unknown.

69 chipped stone tools were found.

Description of the flaked stone tools, 2000:

ID: 563. Rm: obsidian, black. The proximal fragment of a blade, the platform is diedre, the bulb is medium large, there is a ridge on the frontal face, uneven bilateral retouching on the sides, rather stocky. S: 16 x 22 x 4 mm

ID: 328. Rm: chert. A bulky, short flake, atypical. S: 16 x 10 x 9 mm
 ID: 566. Rm: Buda chert, overall patinated. Atypical flake. S: 27 x 17 x 8 mm
 ID: 586. Rm: brownish black, reddish siliceous, patinated on nearly the entire frontal surface. A typical flake, the platform is pointed, the bulb is large. S: 25 x 34 x 8 mm
 ID: 302. Rm: Buda chert. A blade-like flake, atypical. S: 19 x 11 x 5 mm
 ID: 510. Rm: Buda chert, blackish. A core remain, flake, atypical. S: 26 x 15 x 9 mm
 ID: 566. Rm: yellowish grey limnoquartzite. A crescent-shaped, long flake with the attempt to make a saw on the edge, a spoilt pre-saw. S: 33 x 27 x 8 mm
 ID: 642. Rm: Buda chert, cortical in spots on the frontal face, a spot of manganese precipitation on the dorsal face. A crescent-shaped flake on the remains of a core, bifacial saw edge in a single row, sickle shine on both sides, somewhat more worn on the frontal face. S: 30 x 24 x 9 mm
 ID: 464. Rm: brownish yellow, translucent limnoquartzite. Blade or flake fragment? The platform is flat, the bulb is small, there is a streak of cortex on the right side of the frontal face, a ridge in the centre, it could have been intended to be a blade but broke off too soon from the core. S: 21 x 19 x 6 mm
 ID: 580. Rm: Buda chert. A bulky flake, atypical. S: 25 x 18 x 8 mm
 ID: 670. Rm: Buda chert, whitish, transitional to black. A blade-like flake, a ridge on the frontal face, concentric circles on the dorsal face toward the base, the platform is missing. S: 36 x 22 x 8 mm
 ID: 660. Rm: Buda chert. A broken blade? There is no platform, the bulb is medium large, the distal end is broken. S: 23 x 19 x 8 mm
 ID: 376. Rm: Buda chert, with reddish whitish cortex in spots. An exhausted saw, bifacial saw edges made by uneven retouching in a single row, sickle shine parallel, bifacial. S: 22 x 16 x 10 mm
 ID: 677. Rm: Buda chert, grey, cortical in spots. A thin, crescent-shaped flake, of an irregular form, very uneven bifacial retouches in a single row, bifacial, parallel sickle shine. S: 26 x 20 x 6 mm
 ID: 557/a. Rm: Buda chert. A broken blade? Proximal fragment, the bulb is small, the platform is pointed. S: 15 x 17 x 4 mm
 ID: 557/b. Rm: Buda chert. An atypical flake. S: 26 x 15 x 5 mm
 ID: 557/c. Rm: Buda chert. A crescent-shaped flake, long and narrow, saw pre-form. S: 31 x 17 x 6 mm
 ID: 557/d. Rm: Buda chert, sporadically patinated. A bulky, crescent-shaped flake, core platform, 3 large, shallow saw retouches, saw pre-form with retouching. S: 28 x 26 x 11 mm
 ID: 582. Rm: Buda chert, grey with black spots. A crescent-shaped flake with a uniform bifacial saw retouch in a single row, bifacial, parallel sickle shine. S: 30 x 24 x 9 mm
 ID: 625. Rm: Buda chert, sporadically patinated. A blade-like flake, atypical. S: 32 x 24 x 7 mm
 ID: 681. Rm: A piece of quartzite with strong, thick cortex. Cortex removed during the decortication of the core. S: 83 x 54 x 20 mm
 ID: 655. Rm: Buda chert, yellowish reddish, with cortex in a spot on the frontal face. A blade-like flake, atypical. S: 20 x 17 x 4 mm

ID: 588/a. Rm: Buda chert, half of the frontal face is cortical. A crescent-shaped flake, bifacial, fairly uneven retouching in a single row, bifacial, parallel sickle shine. S: 21 x 22 x 11 mm
 ID: 588/c. Rm: whitish limnoquartzite. A bulky flake, atypical. S: 37 x 22 x 11 mm
 ID: 588/d. Rm: Quartzite. An atypical flake. S: 30 x 20 x 10 mm
 ID: 588/e. Rm: Buda chert. Remains of a core, a crescent-shaped flake, pre-saw shape. S: 39 x 33 x 10 mm
 ID: 834. Rm: Buda chert, sporadically cortical. The remains of a core, a blade-like flake, atypical. S: 24 x 18 x 7 mm
 ID: 864. Rm: Buda chert. A blade-like flake, atypical. S: 31 x 21 x 7 mm
 ID: 833. Rm: a yellowish, brownish white limnoquartzite. A saw on a trapezoid flake, bifacial retouches, rather worn saw edge, indented. S: 27 x 24 x 8 mm
 ID: 715. Rm: Buda chert, cortical frontal face. The remains of a core, a trapezoid flake, bifacial retouching, entirely worn off saw edge. S: 23 x 15 x 7 mm
 ID: 589. Rm: Buda chert, grey, manganese precipitation on the dorsal face. The tiny fragment of a flake, 3 saw retouches, bifacial, the retouches are smaller on the dorsal face, slight sickle shine. S: 16 x 14 x 5 mm
 ID: 834. Rm: Buda chert, lilac whitish, cortical at the base. A borer-like atypical flake. S: 33 x 17 x 9 mm
 ID: 828. Rm: siliceous with bluish coating, sporadically with brown cortex. The proximal fragment of a blade. The platform is flat, the bulb is large, there is a ridge on the frontal face, a uniaxially retouched cutting edge on the left side. S: 26 x 16 x 6 mm
 ID: 649. Rm: siliceous? Greyish brown of compact texture. The proximal fragment of a blade, the platform is flat, the bulb is small, a ridge on the frontal face, the right side is transformed into a cutting edge with uniaxial retouching. S: 22 x 21 x 3 mm
 ID: 619. Rm: Buda chert, cortical on the frontal face. A blade-like flake, high ridge, atypical. S: 32 x 17 x 10 mm
 ID: 836. Rm: Buda chert. A typical flake, the platform is pointed, the base is concave, the bulb is large, bifacial retouches on the edge, half-ready or ready arrowhead. S: 30 x 18 x 7 mm
 ID: 817. Rm: Buda chert. An atypical flake. S: 23 x 25 x 11 mm
 ID: 817/b. Rm: limnoquartzite. An atypical flake. S: 25 x 18 x 7 mm
 ID: 160. Rm: Buda chert, cortical frontal face. An atypical flake. S: 35 x 22 x 9 mm
 ID: 889/a. Rm: Buda chert, manganese precipitation on one of the faces, grey, non-transparent. A flake, two broken, worn bifacial saw retouches, bifacial, parallel sickle shine. S: 18 x 15 x 5 mm
 ID: 889/b. Rm: Buda chert, grey, non-transparent. A flake with 3 worn, bifacial saw retouches, bifacial, parallel sickle shine, proximal fragment. S: 17 x 13 x 7 mm
 ID: 829. Rm: hydro/limnoquartzite, thick hydrothermal cortex. A crescent-shaped flake with the original core surface on the side, bifacial saw edge, uneven, parallel sickle shine, mainly on the frontal face. S: 30 x 23 x 9 mm
 ID: 968. Rm: yellowish brown jaspilite, pebble, white cortex on the base. Pebble fragment, proximal. S: 22 x 15 x 8 mm
 ID: 377. Rm: Buda chert. A bulky flake, atypical. S: 27 x 21 x 9 mm

ID: 1042. Rm: Buda chert, cortical. Fragment of a core, core remains. S: 56 x 37 x 27 mm

ID: 814. Rm: quartzite pebble, cortex on half of the frontal face. The cortex was removed from half of the frontal face, it was intended for a tool. An elongated, crescent-shaped flake. S: 32 x 15 x 7 mm

ID: 947. Rm: Buda chert, cortical frontal face. A saw on crescent-shaped flake, worn saw edge, nearly entirely on one side, slight sickle shine, the tip opposite the edge is bifacially retouched for hatching. S: 27 x 24 x 11 mm

ID: 692. Rm: rock crystal or glass? An atypical fragment. S: 21 x 15 x 7 mm

ID: 817. Rm: hydro/limnoquartzite. A crescent-shaped flake, thinning retouch from the frontal face, a pre-saw. S: 20 x 15 x 5 mm

ID: 1033. Rm: Buda chert. An atypical flake. 20 x 12 x 11 mm

ID: 619. Rm: Buda chert, half cortical. Remains of a core. S: 28 x 23 x 18 mm

ID: 688. Rm: Buda chert, cortical at the top in spots. Saw on a crescent-shaped flake with the surface of the core, bifacial saw retouch, uneven, in two or three rows, strong, bifacial, parallel sickle shine. S: 42 x 27 x 11 mm

ID: 319/a. Rm: Buda chert. An atypical flake. S: 21 x 19 x 8 mm

ID: 319/b. Rm: Buda chert, patinated on the frontal face. A trapezoid flake, pre-saw shape. S: 34 x 24 x 10 mm

ID: 160/b. Rm: Buda chert, black variety. An atypical flake. S: 22 x 16 x 9 mm

ID: 958. Rm: Buda chert, patinated frontal face. A flake with a large bulb and pointed platform? Broken base? S: 20 x 28 x 8 mm

ID: 638/a. Rm: Buda chert, sporadically patinated. A flake, atypical, borer-like. S: 27 x 25 x 9 mm

ID: 638/b. Rm: Buda chert. Saw on crescent-shaped flake, very pointed frontal face, bifacial saw edge, uneven retouching, spoilt. S: 24 x 22 x 12 mm

ID: 601. Rm: Buda chert, cortex in spots on the frontal face. An atypical flake. S: 30 x 23 x 5 mm

ID: 584. Rm: Buda chert, patinated in spots, contains cavities and inclusions. An atypical flake. S: 29 x 17 x 9 mm

ID: 923. Rm: Buda chert, patinated in spots. A trapezoid flake, pre-saw shape, unretouched, thick at the saw edge. S: 23 x 22 x 10

ID: 798. Rm: Buda chert, spot of cortex on one face. An atypical flake. S: 21 x 16 x 8 mm

ID: 821/a. Rm: Buda chert, entirely cortical frontal face. A trapezoid flake, pre-saw shape. S: 22 x 15 x 6 mm

ID: 821/b. Rm: Buda chert. A crescent-shaped flake, pre-saw shape. S: 22 x 15 x 7 mm

ID: 998/a. Rm: Buda chert, patinated in spots. An atypical flake. S: 23 x 10 x 6 mm

ID: 998/b. Rm: Buda chert. The fragment of a blade-like flake, atypical. S: 23 x 10 x 4 mm

The distribution of the above according to raw materials is the following:

Raw material	Item number
Varieties of the Buda chert	48
Obsidian	1
Silex types	4
Limnoquartzite varieties	5
Hydroquartzite	3
Quartzite	3
Jaspilite	1
Rock crystal?	1
Silicified wood	1
Undetermined	2

Table 10. Distribution of the flaked stone tools according to raw materials.

Once again, several varieties of the Buda chert can be observed beside the typical grey, translucent one. They are grey non-transparent, greyish black, black, whitish, lilac-white, yellowish-reddish ones and 3 items with manganese precipitation.

Silex types are also varied: one with bluish coating, greyish brown and reddish varieties could be identified. Limnoquartzites were yellowish and whitish.

The following typological list could be made:

Name	Raw material	Item number
Blade	Obsidian	1
	Limnoquartzite	1
	Buda chert	2
	Silex	2
Typical flake	Silex	1
	Quartzite Buda chert	2 1
Half-made or ready arrowhead	Buda chert	1
Atypical flakes	Buda chert	28
Atypical borer-like flake	Buda chert	3
Core remains	Buda chert	10
Saws	Buda chert	12
	Limnoquartzite Quartzite	1 1
Half finished saws	Buda chert Limnoquartzite	7 1

Table 11: Typological grouping of the flaked stone tools.

Two items were determined as cores among the flaked stone artefacts. ID. no. 1042, Buda chert covered by cortex was the fragment of a core, a core remain, while ID. no. 681 had thick hydrothermal cortex enclosing a piece of quartzite (first phase of core preparation: removal of the thick cortex to reach the stone. The interesting feature of the find material from 2000 was the dominance of the great variety of Buda cherts, and the occurrence of quartzite (natural quartzite pebbles) as a raw material of flaked tools. There was a single black obsidian in the raw material stock, which can probably be associated with the Late Bronze Age archaeological material.

All the blades were broken. The obsidian blade (ID. no. 563, Pl. 4/5) and the two silex blades (ID. no. 828 and 649, Pl. 4/4, 7) were retouched along the edges and used as cutting tools.

Other types of retouched tools were represented again by saws. Three worn saws were found (e.g. ID. no. 833 on *limnoquartzite*, and no. 715, Pl. 4/9, Pl. 3/4), and there were four exhausted, small saws (ID. nos. 376, 589, 889/a, b, Pl. 3/3, Pl. 4/10). ID. No. 638 was spoilt (Pl. 4/6). There were two items among the 6 pre-saw shapes that were already retouched but not finished (ID. no. 817, the creation of a vertical bed for the saw edge, Pl. 3/5, and ID. no. 557/d), while a third one (ID. no. 566) was spoilt during retouching.

Retouching technique

The working edges of the saws were always bifacially retouched. Sickle shine was found on both sides in 9 cases and on one side in two cases. The saw edge was made in two, at some places in three rows on find ID. no. 688 (Pl. 4/8). Hafting retouch was applied on saw ID. no. 947 (sickle shine mainly on the dorsal face, observation with regard to hafting). On 4 saws the retouching was uneven (e.g. ID. Nos. 829 and 667, Pl. 4/11).

The significance of the excavation season 2000 were the relatively high number of querns (most of them only fragments) (the majority are fine- or medium coarse-grained, strongly worn), the wider spectre of the raw materials used for flaked tools (including quartzite), and the remains of the Buda chert and a quartzite core (another evidence of local flaking in the settlement).

Stone finds from excavation season 2001

48 stone finds were examined in 2001.

Description of polished stone tools, 2001:

ID: 1455. Rm: pebble. Disc-shape handstone with worn, fragmentary sides. S: 47 x 42 x 32 mm

ID: 164. Rm: conglomerate, coarse-grained. End fragment of a grindstone, hemispherical, finely elaborated, without polishing, the grinding surface is worn, ellipse-shape. S: 65 x 115, 117 x 86 x 50 mm

ID: 1399. Rm: conglomerate. Side-fragment from a hemispherical grindstone with high rim, the grinding surface is smooth, burned. S: 76 x 132, 145 x 85 x 110 mm

Altogether 3 polished stone tools are among the finds, 2 are fragments from grindstones, and the third is a worn handstone.

Description of the chipped stone tools, 2001:

ID: 1455. Rm: whitish Buda chert. Fragment from an uncharacteristic flake, on the frontal face with the cortex of the chert and chipping negatives. S: 19 x 16 x 7 mm

ID: 1589. Rm: Buda chert with cortex. Uncharacteristic fragment from a flake. S: 26 x 13 x 10 mm

ID: 1459. Rm: Buda chert with cortex. Saw on a trapezoid, thin flake, the saw-edge is very worn, the tool is totally worn, unfit for use. S: 29 x 24 x 5 mm

ID: 1547. Rm: white-greyish Buda chert. Uncharacteristic flake. S: 18 x 13 x 7 mm

ID: 1366. Rm: Buda chert. 3 uncharacteristic flakes with chipping negatives.

ID: 1375. Rm: white-greyish Buda chert with cortex. Saw on a bulky, trapezoid flake, the saw-edge was made with bifacial, irregular, uneven retouches, on the back face in two rows, the saw-edge is worn. S: 23 x 18 x 10 mm

ID: 1341. Rm: greyish Buda chert, on the back face with cortex. Uncharacteristic flake from chert-bulbous, a fragment from its surface. S: 38 x 21 x 11 mm

ID: 1324. Rm: grey Buda chert. Uncharacteristic slice-shape flake from a chert-bulbous. S: 30 x 29 x 13 mm

ID: 1444. Rm: white-reddish-greyish Buda chert. Flake with two natural side with cortex, thin, trapezoid. S: 20 x 17 x 8 mm

ID: 1022. Rm: Buda chert. Uncharacteristic flake. S: 17 x 11 x 6 mm

ID: 1452. Rm: Szentgál-type radiolarit. Core-fragment/waste? On the back face with traces of the hard hammer, the bulb was hit down, on the frontal face with one ridge. S: 23 x 22 x 5 mm

ID: 1459. Rm: white-roses Buda chert. Chip, on the frontal and back faces with chipping negatives, one side is natural from chert-bulbous with cortex. S: 17 x 10 x 3 mm

ID: 1334. Rm: Buda chert-bulbous. Bulky fragment from a chert-bulbous, on one side is worked? S: 32 x 23 x 16 mm

ID: 1334. Rm: Buda chert. 4 uncharacteristic flakes.

ID: 1367. Rm: Buda chert. 2 uncharacteristic flakes.

ID: 1367. Rm: Buda chert. Totally worn saw? Trapezoid, thin flake, on the edge with worn saw-retouch? S: 30 x 20 x 3 mm

ID: 1442. Rm: grey-reddish Buda chert. Worn saw on trapezoid, bulky flake, the saw-edge has disappeared, with strong, bifacial, parallel sickle-shine. S: 25 x 21 x 7 mm
 ID: 1442. Rm: white-greyish Buda chert. Uncharacteristic flake. S: 25 x 22 x 16 mm
 ID: 852. Rm: red-greyish Buda chert. Pre-saw or worn saw with one natural side, trapezoid flake, on the sharp edge the retouches disappeared, or is it a wear-trace? S: 25 x 30 x 9 mm
 ID: 1321. Rm: Buda chert. Saw on trapezoid flake, with 2 saw-edge, both is worn, made with bifacial, tiny retouches, the retouches on the back side are in one row, a 3. side is retouched also (hafting?), the saw edge is thin, even. S: 25 x 23 x 5 mm
 ID: 1288. Rm: reddish-greyish Buda chert. Saw on trapezoid flake, the side edges are retouched from the frontal face, the saw edge is bifacial, even, the parallel sickle-shine is bifacial also. S: 26 x 23 x 6 mm
 ID: 1242. Rm: Buda chert. Uncharacteristic flake. S: 20 x 21 x 7 mm
 ID: 1324. Rm: Buda chert. Pre-saw on flake, a ridge on the frontal face, on the frontal and the back faces are concentric circles of the hard hammer. S: 29 x 24 x 7 mm
 ID: 888. Rm: Buda chert. Uncharacteristic flake. S: 21 x 14 x 8 mm
 ID: 1297. Rm: jasper pebble. Pre-saw or worn saw: on a slide-shaped flake, on the sharp edge with wear-use, ad hoc cutting edge or totally worn saw-edge? S: 38 x 22 x 10 mm
 ID: 1308. Rm: Buda chert. Borer on a triangular flake, the point of the borer made from one side with a retouch from the frontal face, the point is worn, on the frontal face is a ridge. S: 27 x 20 x 7 mm
 ID: 1288. Rm: dark-grey Buda chert, cortex on the frontal face. Saw on a crescent shape flake, the saw edge is made with bifacial retouches in 3 rows, the edge is even, the sickle-shine is bifacial, the other side-edges are retouched also, with unifacial retouches – multiply transformed? S: 39 x 28 x 10 mm
 ID: 852. Rm: brownish-reddish grey Buda chert. Saw with a totally worn saw-edge on a blade-like, thin flake. On the back face with a few retouches, on the opposite edge of the saw-edge retouches also, on the frontal face with narrowed bed of the saw-edge. S: 28 x 16 x 5 mm
 ID: 1377. Rm: Buda chert. 3 uncharacteristic flakes. S: 31 x 24 x 8, 21 x 11 x 5, 20 x 18 x 7 mm
 ID: 1292. Rm: white Buda chert. Uncharacteristic flake. S: 28 x 21 x 8 mm
 ID: 1253. Rm: Buda chert. Uncharacteristic flake. S: 24 x 17 x 12 mm
 ID: 1301. Rm: Buda chert. Long, uncharacteristic flake. S: 27 x 12 x 6 mm
 ID: 1322. Rm: whitish Buda chert. Saw on a trapezoid flake, the saw edge was made with bifacial retouches, with parallel, bifacial sickle-shine on the edge. S: 28 x 24 x 10 mm
 ID: 1296. Rm: Buda chert. Chip. S: 14 x 13 x 3 mm
 ID: 1289. Rm: Buda chert. Fragment or remain of a saw, with one bifacial saw retouch on the edge, and bifacial sickle-shine. S: 17 x 13 x 4 mm
 ID: 852. Rm: Buda chert. Uncharacteristic flake, S: 26 x 17 x 14 mm.

atypical flakes, fragments from chert-bulbous. The tools are: 10 saw, 3 pre-saw, 1 totally worn borer (*Pl.* 3/8) and a remain of a core. The raw material were Buda chert, except in one case jasper-pebble and a Szentgál-type radiolarit. The saws made on atypical (slice-shape, trapezoid or crescent-shape) flakes, one was fragmentary, 5 were with very worn saw edges. The saw edges were bifacial in 6 cases, one had 2 saw-edges (*Pl.* 3/7.), on another tool the edge was made in 3 rows, on two others the edge was made on the back face in 2 rows. On 5 saws we can see bifacial, parallel sickle shine on the edge.

Conclusions drawn so far from the finds of recent excavations – Summary

Owing to recent excavations (Horváth 1997; Horváth et al. 2000, 2001, Pető et al. 2002), the stone tools of four excavation seasons can be analysed (1998, 1999, 2000 and 2001). Due to new excavation techniques and modern aspects, the number of the few centimetre large items recovered during the excavation has significantly increased (among them the majority of the flaked tools). Although the new results are not yet fully evaluated, they seem to bear such important even in this early stage that we find it necessary to mention the significant details.

Altogether 376 finds were examined, which were made from stone. 97 were polished, and 279 were chipped stone tools.

While about 30 flaked tools were recovered from the whole layer series of the “old” excavations, this number was 50–100 at the recent excavations. It is exactly known in the cases of these artefacts in what circumstances, in what layer and archaeological feature they were found. So by the end of the excavations we can make realistic calculations concerning the flaked stone tool demand of the inhabitants or a community of the same period with a similar way of life, and the location of the finds help to determine where they were made within the settlement and what happened to the damaged items.

The majority of the chipped stone tools were made from Buda chert, which appears in several shades and forms. It implies that the raw materials of the finds perhaps did not come from the same

Altogether 45 chipped stone tools came to light in 2001. Most of them are chips, uncharacteristic,

geological source (mine). It can also imply, however, that there were great divergences in the appearance of the raw material within a geological source. In most cases it can be observed, that the chipped stone tools, made from Buda chert, contacted with fire. It could have happened in the mine (cracking of the rock), especially before tool production, or in the settlement, when they produced the tools. The heat-treatment has mended the quality of the Buda hornstone: its structure became more homogenous, easier worked.

Regarding the raw material types, the proportion of other raw materials is higher in the recent excavation material (silex, hydro- and limnoquartzites).

Again appeared the well known, so-called Garam-valley-type limnoquartzite: a jet-black, greasy stone with white plant-threads in its material. Among the new finds a larger and a smaller sized saw on flakes and a blade-core were made from this type of raw material. We have to examine more the limnoquartzite from Garam Valley to identify its real, exact source. It is an important question, because it came from outside the borders of the Vátya culture, as an import raw material.

There is a retouched knife-blade, on the distal terminal with end-scraper, made from Banatian lidit. Same raw material is known from another settlement of the Vátya culture: we can find this type of raw material in the chipped stone's treasure of Dunaföldvár-Öregdomb (T. Biró 2000).

The productivity success of tool production from the poor quality Buda chert could be the same as we experienced during our experiments (carried out in the Archaeological Park at Százhalombatta in the summer of 2000, Antoni – Horváth 2003). A more-or-less usable flake could be removed by every second blow from the prepared core, or the natural, usable round chert-bulbous, which could later be used for tool production. In the recent excavation material, the proportion of the waste and the tools is consequently around 50–50% each year. We know core remains that could not be used any more for blade or flake production because they were spoilt or exhausted, that is no more stone could be removed.

Saws made usually on slice-shape, crescent-shaped or trapezoid flakes. Few of them perhaps were mostly typical flakes when they were removed from the core. They had regular platforms and bulbs. They measured about 45–49 x 40–30 x 10–13 mm. The tools got strongly worn during use (on cereal stalks), especially on the side of the saw edge, so the edges had to be rejuvenated several times. This incurred a significant decrease in size. The majority of the saws in the excavation material were worn to a size of about 20 x 24–16 x 10–6 mm, and there are quite a few items that got so small that they could not be used any more (16–18 x 15–13 x 7–5 mm). They could be used, however, inserted into a socket or handle, and they were certainly used since fresh sickle shine can be seen on the surviving saw edges.

The tools could easily be damaged due to the poor quality of the Buda chert. The tools were fragile along inclusions, cavities and fissures and they broke. There are very few tools among the saws, due to breaks and wear, that show the size and shape of the initial flake. So it is difficult to answer the question if the saws were inserted into bone, antler or wooden handles for easier handling, or they were used separately, kept in hand, as cutting tools. The thinning retouching on a few saws opposite the old edges were applied for hafting, but it can rarely be observed. It is also possible that this part disappeared from the majority of the tools during usage (broke off, wore off, the small size did not afford a new hafting retouch).

The tools were probably splintered with hard hammers (pebbles) in the settlement. It seems that the cores arrived in the Bronze Age settlement as lumps, perhaps as end-products of miners specialised in this work. The necessary decortication and preparation of the cores was made in the settlement. This is proved by the few core remains, which were found with or without cortex, the tiny, few millimetre large chips, the by-products of splintering, and the quartzite pebbles wearing the traces of hammering. We can say, accordingly, that the Bronze Age population of the Earthen fort in Százhalombatta made the splintered stone tools in the settlement.

Due to quick wearing, the tools had to be constantly rejuvenated. It was also made with a

hard hammer along the flaking surfaces of the stone, more-or-less arbitrarily removing the unnecessary or protruding parts trying to create the same shape in a smaller size (trapezoid or crescent-shaped). The loss was great.

The saw edge was made in more than one phase (at least two). Since the flakes were thick, people usually tried to thin them with flaking toward the saw edge, creating, so-to-say, a bed for the saw retouch of the second phase. This bed was prepared longitudinally (as if it were a blade), or crosswise with several retouches, usually from one side. This was followed by the actual saw edge retouching, which was usually made by evenly deep scalariform retouches in a single row from both faces (bifacially). The retouch can be uneven when the material does not afford more. If the frontal or dorsal faces of the flake are too high, the retouches are arranged in several rows, because this is the only way a saw edge can be reached. All these solutions are represented in the find material. The saw edge could be made with bone (e.g. rib). In our experiments this was the object that resulted a similar productivity as observed in the find material.

The flaked tools other than saws (e.g. blades) were also cutting tools, which is suggested by the traces of wear on the sharp edges. The majority, however, were broken, and we cannot demonstrate it with certainty.

The surfaces of the majority of the tools are covered by cortex or patination of various thickness, which developed partly in the archaeological, partly in the geological environment.

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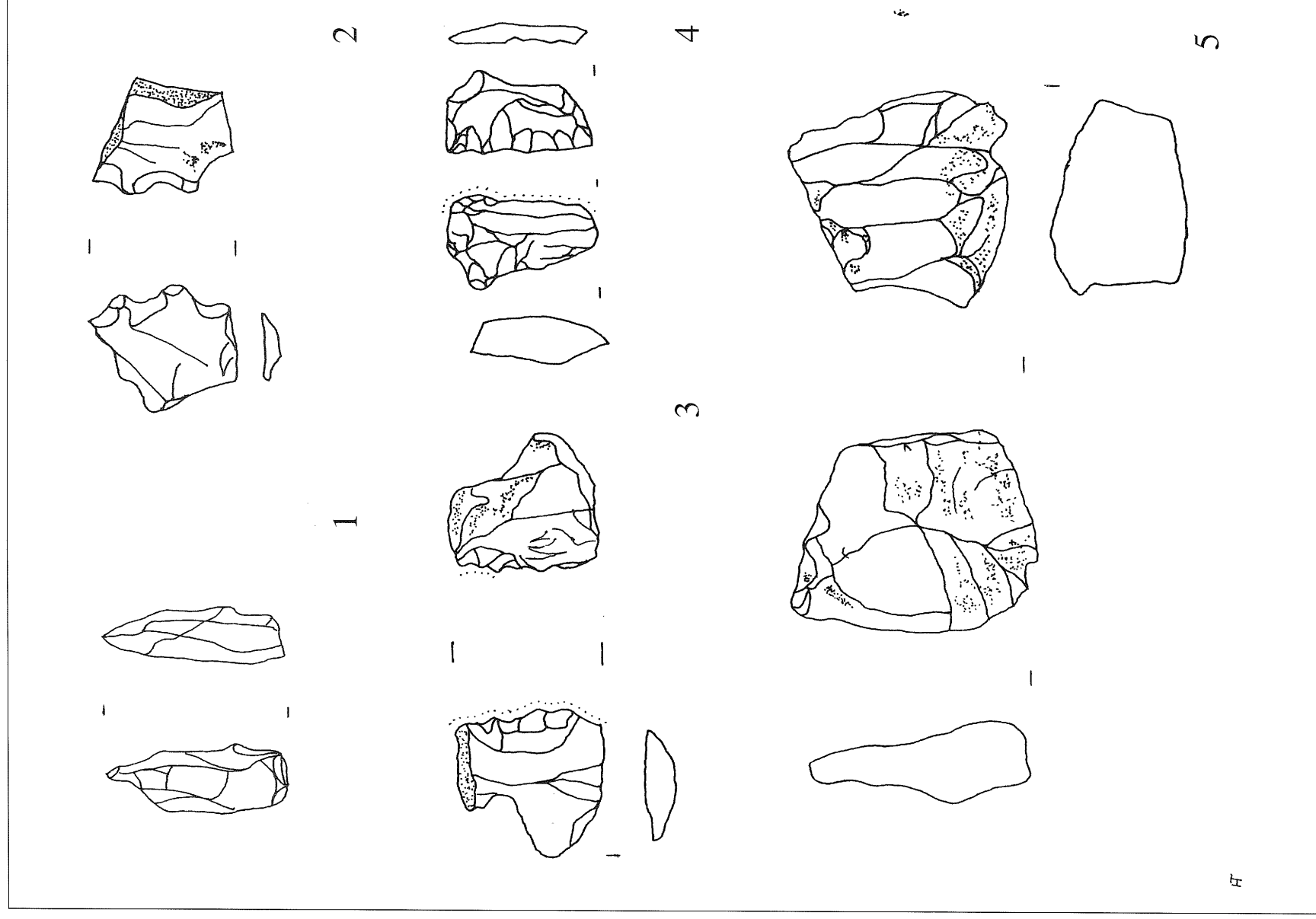


Plate I.

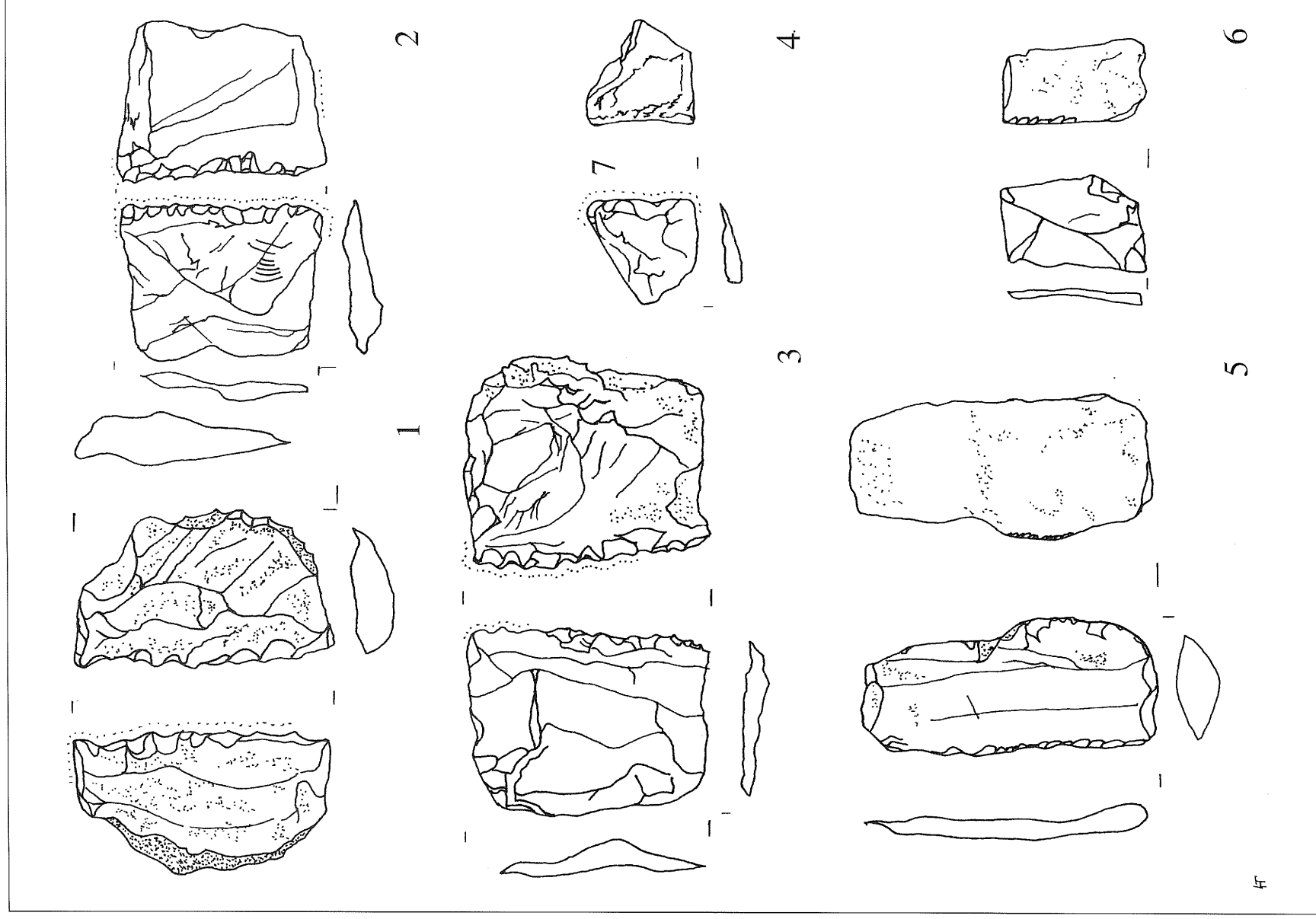


Plate 2.

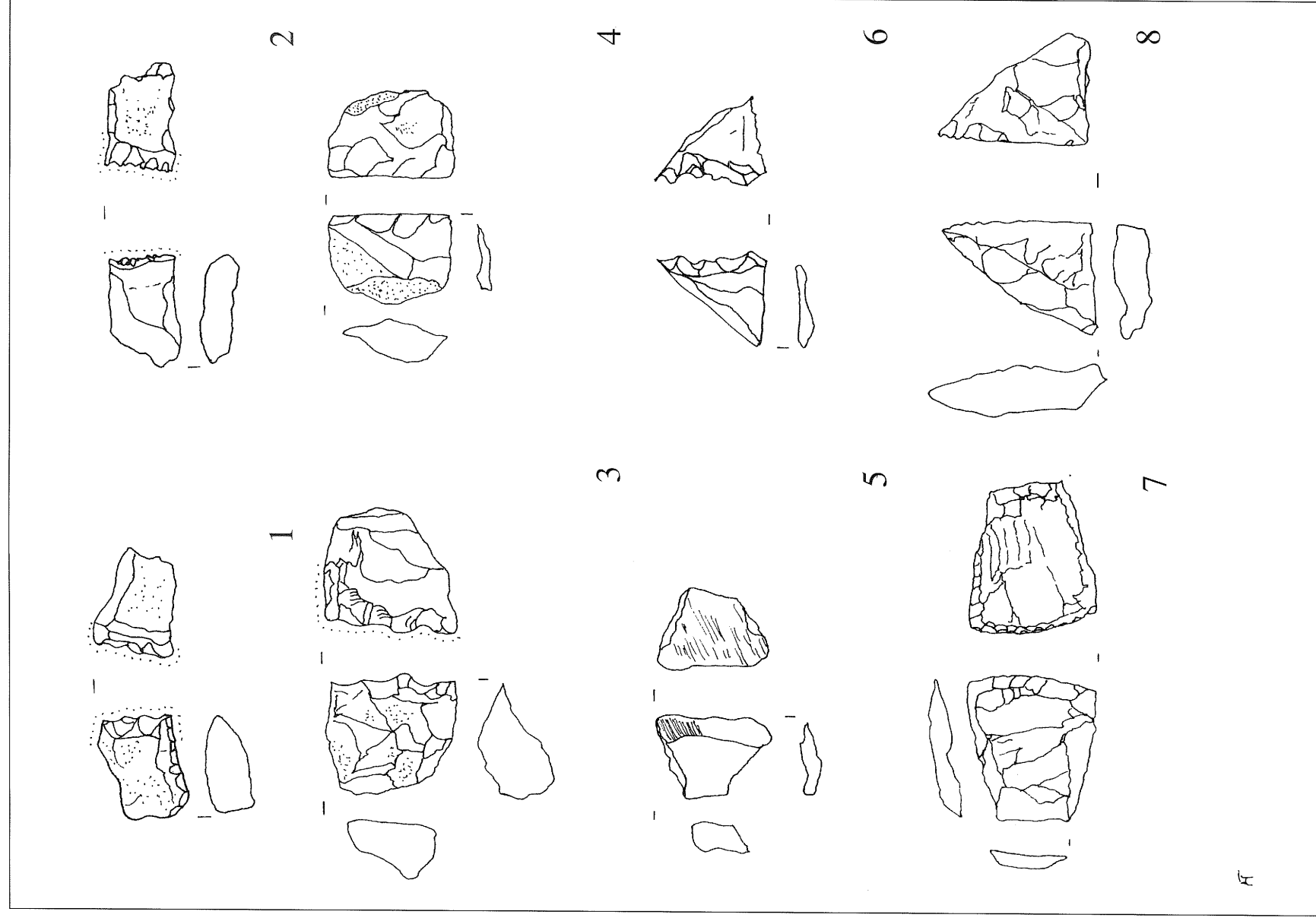


Plate 3.

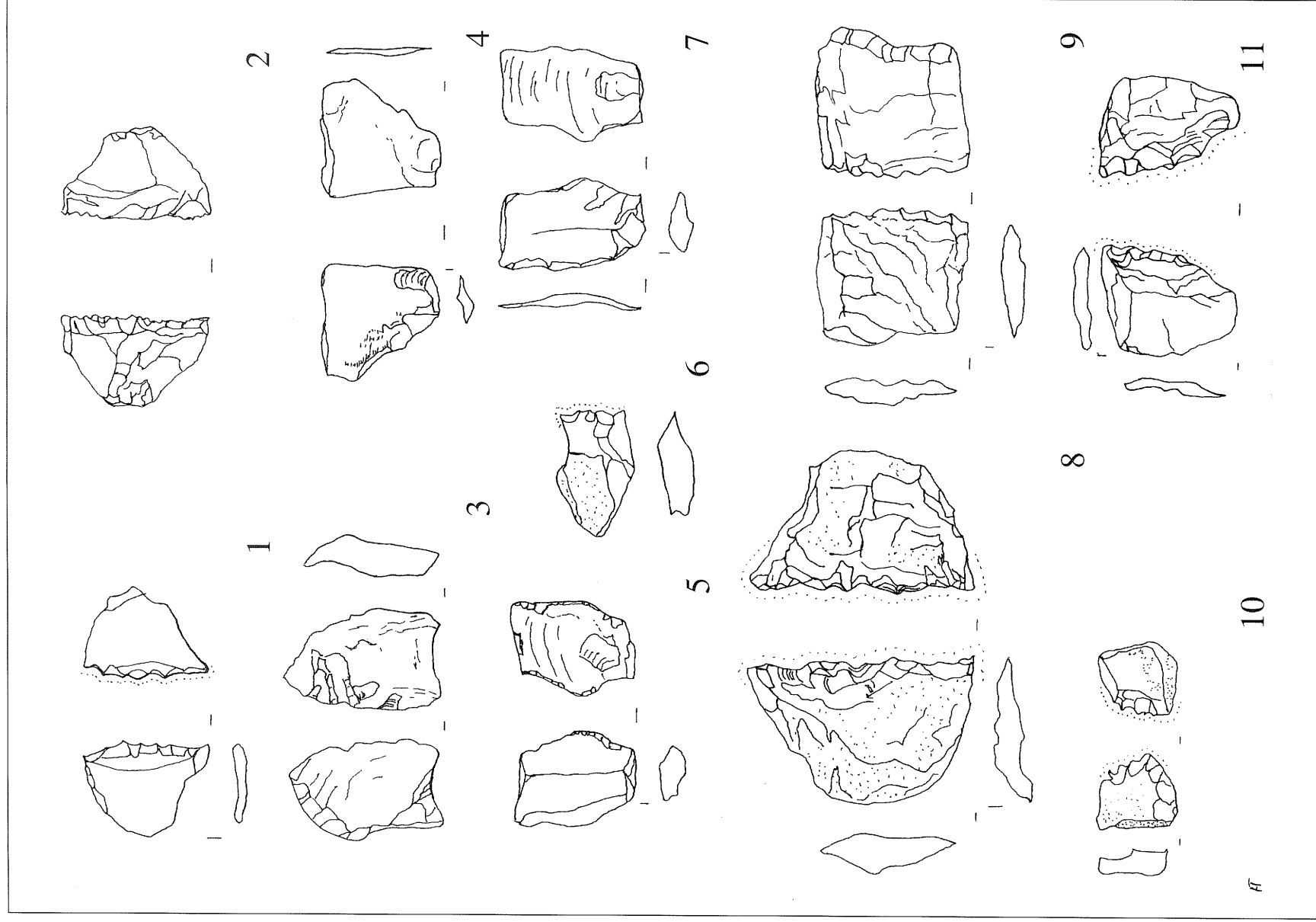


Plate 4.

